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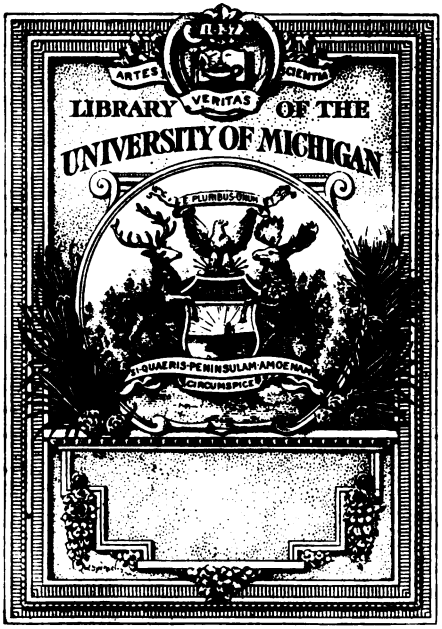

THE GIFT OF
Prof. I. N. Demmon.

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"WHAT PROFESSION SHALL I CHOOSE,

AND

HOW SHALL I FIT MYSELF FOR IT?"

WITH A BRIEF STATEMENT OF THE FACILITIES OFFERED AT CORNELL UNIVERSITY

And a Prefatory Note

BY ANDREW D. WHITE

ITHACA, NEW YORK

1884

INDEX OF SUBJECTS.

PREFATORY NOTE 5
ARCHITECTURE 7
CHEMISTRY APPLIED TO THE USEFUL ARTS 10
CIVIL ENGINEERING 16
DRAWING, FREEHAND AND MECHANICAL 19
ELECTRICAL ENGINEERING 22
FARMING AND APPLIED AGRICULTURE 24
GEOLOGY, APPLIED 28
JOURNALISM 31
LAW 36
MECHANICAL ENGINEERING 39
MEDICINE 44
MINING ENGINEERING 46
TEACHING 47
THEOLOGY 49
PHYSICAL CULTURE 53
GENERAL PREPARATION OF THOSE UNDECIDED AS TO A PROFESSION 54
NOTICE REGARDING THE UNIVERSITY REGISTER 59

PREFATORY NOTE.

DURING many years I have been receiving letters from parents asking, "*To what profession and how shall I educate my children?*" and from young men and young women asking, "*To what profession and how shall I educate myself?*" Beside these general questions have usually come special questions as to opportunities at Cornell University. Hence I addressed to several professors in this institution the following letter:

My dear sir: Will you please give me your views upon the following points:

1. What is the present demand, and what the probable future demand, for educated young men in your department?

2. What attractions does that profession offer to students as regards compensation, independence, mode of life, surroundings, etc.?

3. What tastes and characteristics in a young person would, in your judgment, tend to show a natural aptitude for the profession?

4. What advantage does the student who has received a thorough training, scientific and practical, have over the man who "picks up" his profession?

5. Is there at present any difference in favor of the thoroughly educated professional man which did not formerly exist?

6. What facilities are offered by your department for giving the training required in the profession?

7. What preparation would you recommend to young men intending to enter your department?

8. Will you please add any general considerations which occur to you.

From the answers to these inquiries and from other sources has been prepared this pamphlet, which it is hoped may be of use to the public.

ANDREW D. WHITE.

Cornell University, Ithaca, N. Y., March, 1884.

ARCHITECTURE.

DOWN to a recent period trained architects in our country were few; but with increased wealth and improving civilization has come a demand for the application of the science and art of architecture to buildings of every sort. It is felt to be not enough that the public building or dwelling or store be fairly convenient; it must satisfy the growing desire for beauty of proportion, adjustment of parts, fitness of material, legitimacy of decoration. More and more we are learning that a building erected by a true architect will grow more beautiful and valuable for generations, while a building erected by a sham architect will soon be an incubus. Our people are laying out millions on millions in buildings which within thirty years—in the advance of taste and knowledge—will be eye-sores and must come down. Every month we hear of some architectural failure that costs life and treasure. To-day it is a church floor which gives way, and a multitude of children are taken from the ruins mangled and dead; to-morrow it is a whole city quarter swept away by fire, because some half-taught architects knew no other way of producing architectural effect than by piling up combustible ornaments on inaccessible roofs. More and more the idea is forcing its way that men are wanted in this profes-

sion who have scientifically informed themselves regarding the best materials, who can calculate their strength in construction, who can combine material and construction according to the eternal laws of symmetry and beauty and not according to some petty passing fashion.

Hence has arisen a great and increasing demand for thoroughly trained architects in the myriads of towns throughout our Union; at present, though the opportunities are so great, the number of such architects is small.

In establishing the Department of Architecture the Cornell University has had the foregoing facts constantly in view. In the course laid down the endeavor has been to ground students thoroughly in the principles of architecture as a science, and in its historical development as an art, in the application of facts and principles to meet various needs, in the best practical construction, on one hand, and the best means of satisfying the love of beauty, on the other.

To this end there has been accumulated for the use of the department probably the largest and most complete architectural library in the country, beside a collection of over three thousand carefully selected photographs, external and internal, of the most important buildings in civilized nations, a large collection of drawings and models illustrating every department of actual construction, and a collection of samples of building and decorative materials, natural and artificial. The constructive side is illustrated by models showing the best methods and combinations in stone, wood, and iron; the decorative side, by everything obtainable which could be of use in developing a sense of architectural beauty. The latest addition to these means of illustration is a large collection of casts of the most beautiful Gothic sculpture in England.

As to natural aptitudes, an interest in art, and especially in art as connected with construction, whether developed before entering college or after, is very significant.

As to preparation, close attention to the required studies laid down in the University Register is all that is absolutely demanded ; but general reading, during leisure hours, in the history of the leading nations, especially in connection with their art development, and of the biographies of their greatest artists, has often proved a valuable stimulus.

As regards the attractions of the profession, the position of a successful architect is of course socially high. Touching, as he does, both the industrial and the artistic sides of society, he has peculiar advantages as to acquaintance and influence. While he is on the one hand brought into contact with business interests, he touches on the other the domain of the artist, so that his life is better worth living than that of many about him.

As to the process of getting into the active ranks of the profession, it is doubtless rendered somewhat slow by the great number of young men imperfectly prepared ; still there is a very large demand for good draughtsmen in architects' offices ; and, in the position of draughtsman, a young man thoroughly well-grounded and prepared will soon show the qualities which insure rapid advancement.

CHEMISTRY

APPLIED TO THE USEFUL ARTS.

IT may be safely stated that the demand for men well trained in applied chemistry is greater than the supply, and is likely to remain so for many years. The rapid increase and extension of American manufacturing industries, and the growing respect for scientific methods among practical men, make this demand more and more evident.

A look into some of the leading departments will show us that this demand for analytical chemists is steadily and rapidly growing. In almost every iron manufactory and in other metallurgical establishments the assistance of one or more trained analysts is now found a necessity. It is only a few years since all our iron and steel works were conducted by "practical men"; but the country has of late years made such rapid strides that we have already overtaken Great Britain in the manufacture of Bessemer steel, and in other departments are rapidly approaching her. To-day every steel manufactory is provided with its technical laboratory and with one or more chemists. Pig iron, which was formerly made altogether by "rule of thumb," is now a chemical product; ores, fluxes, and fuels must be analyzed, and although only the larger establishments employ chemists steadily, this work draws largely upon the attention of the profession in all parts of the country.

Yet this is but one of the fields open to the practical chemist of to-day. The important development in almost all the arts within the last few years is very largely due to the steady increase in the number and variety of the practical applications of science. In this respect chemists have certainly not been behindhand. In bleaching, dyeing, and printing cloths, in the manufacture of soap, candles, paints, and the like, in the extraction and refining of all useful metals, in the manufacture of pharmaceutical preparations and a long list of articles known technically as chemicals, in the making of soda ash, acids, and fertilizers, and of various articles used in household economy, as well as in numerous other branches, chemical industry finds a wide application. The Pennsylvania Railroad has its chemical laboratory and corps of chemists. The Agricultural Bureau of the Interior Department at Washington, the United States Geological Survey, various State surveys, and numerous agricultural experiment stations are all similarly equipped. The number of chemists working in one or another of these channels is already large, and is rapidly growing. In our larger cities there has arisen a recognized body of professional chemists, who are busily employed in making analyses and in assaying. This branch of the profession is comparatively new. It is not many years since the only analytical chemists in the country were, with few exceptions, college professors; but the amount of work pressing upon those residing in populous cities gradually became so great as to create a demand for chemists who could devote their entire time to this profession.

As a consequence, many questions are submitted to the practical chemist which in former times were left untouched; as, for example, the quality of water used for domestic purposes, the availability of water for use in steam boilers, the

characteristics and contents of mineral waters, the adulteration of foods, drinks, and medicines, the detection of poisons, the analysis of ores, with the best process for mixing and improving them—these are but a few of the questions we are to-day referring to the analytical chemist.

In short, the connection between chemistry and every-day life is already close and is steadily growing closer; the opportunities which a career in this science offers to young men are sure to increase with the increase of the nation in numbers and wealth.

As to the attractions of the chemist's profession, perhaps most worthy of note at present is the fact that it opens so rapidly, to men who are prepared to take them, high and responsible positions. A young man of ability, conscientious and energetic, often makes himself in a very short time practically indispensable in an establishment employing large capital; the result is that he is likely to be rapidly advanced to the position of superintendent or manager in important branches of the business, and thus to become what may be called a high-class metallurgical engineer and manufacturing expert. In general, the post of chemist is the only stepping-stone to practical metallurgy or chemical manufacture; competent assayers find the way to practical mining speedily opened to them and have at their command always a means of livelihood, and often much more than that.

Apart from the possibilities of certain support and rapid advancement, the chemist's profession affords in itself an inviting career. The salary of an analyst in a manufacturing establishment is from one thousand to two thousand dollars per year, often with the privilege of taking outside work, which in manufacturing centres may be very considerable. The work is skilled labor in the highest degree—

expert labor, in fact—and the chemist who has made himself thoroughly familiar with it can always have the satisfaction of knowing that he is almost indispensable to his employers and associates.

To these advantages may be added the opportunities to inventive and enterprising men for extending the boundaries of the profession. In no department is experiment more likely to lead to inventions of value. Take two or three recent examples: A chemical discovery in coloring matter has given a substitute for madder, and restored the great area required for the cultivation of that material to the increase of material for human sustenance; an apparently trifling application of another chemical principle has enabled the salt manufacturers of the State of New York to purify their product so that it now competes with the world for dairy purposes; another application has enabled another part of the State to make quantities of steel formerly undreamed of; and still another recent chemical invention is drawing large capital into the making of soda ash, and thus proving of vast value to a multitude of industries.

And, finally, the profession has an incidental advantage well worthy of thought. In almost all other professions there must come between the instruction in college and the actual taking hold of business a period of practical apprenticeship in the world outside; but in chemistry a graduate of a good school has had thorough practice in exactly the kind of work he will be called upon to do in practical life, and has to serve little if any apprenticeship as a subordinate.

To sum up, then, the chemist's profession offers to all who embark in it with earnestness and ability sure support and rapid advancement in an ever-widening field of usefulness.

As to natural aptitudes, no man is likely to become a good chemist who does not develop some taste for physical science. This taste may not show itself in boyhood, or while a young man is preparing for college, since there may not be anything in these years to awaken or stimulate it; but in an institution properly equipped for such work a young man can speedily find whether he has the requisites for success. The profession of the chemist is more than manipulation, and problems are sure to present themselves which only the student with his heart in the work will have the patience or ability to solve. Delicacy and accuracy of manipulation are natural gifts to some men, but may generally be acquired in a considerable degree by practice.

As to the advantage of training in technical schools, such training has now become the only preparation at all adequate. The profession is now so far advanced that no "rule of thumb" man can hold a place in it. So far as is known, there is at present no chemical analyst of any note employed in any establishment who has not been trained in an American or foreign scientific school. Assaying is, indeed, more of a trade, and involves comparatively little scientific knowledge; but even in this the well-trained chemist has great advantage over the man who has "picked up" his ideas of the subject, both in fertility of resource and in ability to extend his work over a wider field. This necessity for men of thorough training has become clearly understood among investors; capitalists who put their money into large undertakings have learned by experience the value of experts, particularly in the examination and appraisal of mines. Railroad companies, when they give orders for rails, stipulate for material of a definite chemical constitution; boards of health and the medical faculty no longer decide doubtful sanitary questions by wagging their heads,

but refer them to chemists trained in the best processes; in fact, where the policy of "cut and try" was formerly the rule, the solution is now obtained in less time and at diminished cost by employing the facilities of the best laboratories.

As to preparation for the Cornell University course in chemistry and kindred science, there is needed, first of all, as good a common-school education as can be secured, and next, its careful development through the more advanced stages, especially in higher arithmetic, algebra, and geometry, as required in the Register. But, in preparing to enter this and kindred departments in the University, it should be borne in mind that the facilities for scientific work are far greater after one enters college than before; that the great thing is to lay thoroughly the general and mathematical foundation required for entering the University, deferring extended work in chemistry and physics until after entrance.

As to facilities offered, the new Chemical Laboratory is, to say the least, equal in completeness of equipment and convenience to any in the country; its course of instruction is certainly as thorough as any. Special pains has been taken that the instruments, apparatus, appliances, and cabinets of specimens bearing upon the course be as complete as possible; over one hundred thousand dollars has been expended by the Trustees upon this building and its equipment within the past three years.

CIVIL ENGINEERING.

IN a nation like our own, occupying so vast an extent of territory, filling up so rapidly, and developing more and more the wants stimulated by an advancing civilization, there must constantly be a great demand for new and improved means of inter-communication, both with reference to travel and traffic—hence a constant call for Civil Engineers. Financial crises slacken this demand at times, yet for very brief periods; the country soon resumes confidence, and presses on more vigorously than ever. Not only does the opening of new enterprises, but the care of those already in operation, increase this demand. It is a pertinent fact that, at the close of the last University year, there still remained three applications offering immediate positions to any graduates whom the President would recommend, at salaries varying from $1200, to $1500.

In days gone by, the men who "picked up" the profession were generally thought good enough for the required work; but this period is rapidly passing away. While, under the old system, there were undoubtedly many displays of natural genius, it is no exaggeration to say that millions on millions of dollars have been lost by the employment of half-educated engineers. Proofs of this meet us on every side—lines of railway in wrong positions, bad grades and curves,

tunnels cut and bridges built that might have been avoided, water-supply systems made failures for want of proper calculation as to friction, whole districts sickened by badly managed drainage, fearful catastrophes on railways caused by the falling of bridges devised by men who had not been properly trained but had shown skill on the purely "practical" side. These facts are more and more recognized, and hence the increasing demand for engineers thoroughly educated in the best modern theory and practice. No science has been advanced more rapidly ; in every civilized country large numbers of the strongest minds have been devoting themselves to it, and the man who is to take any rank as a civil engineer henceforth must know what these leaders in his profession have been thinking and doing.

As to incentives, the profession of Civil Engineering offers not only excellent prospects of success and of high standing in communities, States, and the country at large, but affords satisfaction to some of the noblest feelings of a thoughtful man. To aid in developing the great industries, and especially the main lines of communication, in a nation such as ours is to be, is a work calculated to stimulate the best ambition of any man. This is no merely professional sentiment. A few years since, the Governor of one of our largest States, traveling on one of our main trunk railways from east to west, left the train at the Suspension Bridge station, with his son, took him upon the bridge, showed him the simple inscription giving the name of the engineer who had designed it, and then said to the young man : "I would rather see your name thus inscribed upon such a monument as this, than to see it attached to any of the highest political offices in the gift of the American people."

The course in Civil Engineering has also the advantage that the discipline it affords is very valuable with reference

to any profession. Even if the student decides not to become a Civil Engineer, he will find that the close thought and study, as well as the knowledge acquired in it, give him an admirable basis for work in many other departments of American activity.

As to facilities offered at Cornell University, it is not too much to say that they are surpassed by none in the United States. The Trustees have made every effort to provide the most extensive and thorough equipment, and have put it under the charge of professors thoroughly competent. The head of the department, and the President of the University, have recently visited the leading engineering schools of Europe ; and the Trustees have purchased, in France, England, and Germany, everything in the way of instruments, models, drawings, photographs, testing machines, and the like, recommended to them. Thus has been formed a series of collections for illustration, experiment, and investigation, which are certainly not exceeded, and probably not at present equaled by any in this country.

The students who have been graduated from the department thus far have been generally employed and rapidly advanced.

As to natural aptitudes for this profession, good mental capacity, strong sense, and a taste for the applied sciences, especially the mathematical, seem to afford the best guarantees for success.

As to preparation, close and thorough work upon the requirements laid down in the University Register is recommended as a foremost necessity. As a stimulus, and at the same time a recreation, nothing can be better than readings in the well-known works of Smiles, especially his "Lives of the Engineers.'

DRAWING,

FREEHAND AND MECHANICAL.

THERE is a large and increasing demand for educated draughtsmen, in connection with manufacturing establishments of various sorts. The call by engineers and architects for a high class of work, the constant invention of new machinery and new adaptations of old, and especially the art industries, such as those devoted to the manufacture of wall-paper, furniture, articles of decoration, jewelry and silverware, carpets, calicoes, various woolen fabrics, the illustration of books, magazines, and newspapers by wood-engraving and lithography—in all these and many others, the demand is great and sure to increase. In these industries large sums are paid for foreign designers to do work which might as well be done by natives. There is no question that for this department the man who has received the proper training in a technical college has a great advantage over one who has merely "picked up" his profession. Questions continually arise, especially in drawing connected with the great industries, that can be solved only by a man having a fair knowledge of physics and mathematics. And in art industry arise frequently questions in which light can only be obtained from a knowledge of archæology, and of the history of art.

There are multitudes of cases where, for want of training in these supplementary branches, talented draughtsmen have accomplished but a tithe of what they might have done. It need hardly be said that the habits of systematic study and thought that are acquired by one who has received a thorough training in a technical school are of the greatest value, whatever profession he may follow. All thoughtful testimony concurs in the assurance that there is much more now than formerly in favor of the thoroughly educated man in this department.

Compensation depends, of course, upon the skill and ability of the individual. As a rule, good draughtsmen command good salaries and are rapidly advanced.

As to natural aptitudes, any young man or woman, in order to succeed in this profession, should have a natural bias toward artistic work; without this there is little chance of reaching the higher positions. This, with patience and perseverance, will give the best possible basis for success.

As to facilities offered, Cornell University has provided for free-hand drawing, two large rooms; for Mechanical Drawing in connection with Mechanical Engineering, two rooms; for Mechanical Drawing in connection with Civil Engineering, four rooms; and for Drawing, both mechanical and artistic, connected with Architecture, two rooms. These draughting rooms are large, well lighted, furnished with the necessary fixtures, including tables of various sorts designed especially for drawing purposes, and blackboards for practice in rapid drawing—the latter being essential to those who are preparing themselves for teaching. In these the professor of Freehand Drawing, and assistants in the various departments, take charge of the students. The department is supplied with a large collection of engravings and drawings used in the foremost schools of Europe, models

for work in perspective and in the study of light and shade, and casts, embracing studies from nature, of the figure, of historical ornament, etc. The full course begins with first principles, is progressive, and lays a thorough foundation for work in any profession where drawing is required. Students are trained carefully, not only in outline drawing, in the principles of perspective, in the theory and application of light and shade, and in the best methods of drawing from objects and from nature, but special instruction is also given with reference to special professions—and, among other applications, careful attention is given to the methods of preparing drawings for photo-engraving.

As to the preparation for admission to this course, it is recommended that applicants, in addition to the usual requirements for entering the University, which may be found in the Register, embrace every opportunity of mastering the elements of drawing, thus securing that control of the hand and training of the eye which fit the student immediately upon entering the University to begin more advanced work, and thus to obtain more time for special study.

ELECTRICAL ENGINEERING.

THE great extension, during the past few years, of companies for telegraphic and telephonic communication, electric lighting, electro-plating, electrical propulsion on railways, the electrical transmission of power, and of establishments for manufacturing electrical apparatus for these has created a demand for men thoroughly versed in electrical science as experts, inspectors, managers, superintendents, and the like. Especially are men needed who can test and adjust instruments, as well as lay out and properly proportion the different parts of new establishments.

The supply of such trained men is now and will probably remain for some years short of the demand. Salaries range from $50 per month to $5000 or even $10,000 a year. There is abundant employment for competent young men at salaries from $100 to $150 per month as managers of telephone exchanges, testing officers of telegraph companies, electricians for electric-lighting companies, and superintendents in charge of various "plants." The highest salaries will be obtained by the few who show marked ability in developing the application of electrical science or in arranging and systematizing the workings of extensive systems. At present, while so much is in a tentative stage, the applications of electricity furnish a very attractive field to young

men of well-developed inventive powers, extended and disciplined by systematic study and experiment.

Among the more important aptitudes giving promise of success are a good degree of ability in mathematics, a taste for observation, and ability to grasp the principles of the physical sciences.

The men who "pick up" the profession rarely acquire the basis of mathematical and scientific knowledge requisite to the clear apprehension of their work. Such men cannot rise to the high positions in the profession, except by acquiring under great difficulties the very knowledge for which the technical schools furnish special facilities. A very limited experience will enable the man who has a theoretical knowledge to do all that can be done without this knowledge after an experience of years.

It is in view of these facts that the Trustees of Cornell University have established a course in Electrical Engineering, and have equipped their new physical laboratory largely with reference to its demands. They have brought together a great variety of instruments for measurements of resistance, currents, electro-motor forces and capacities. Various electric-lighting systems are in actual operation, and everything is arranged so that all the different elements, including power to drive the machines, may be measured. Students in the department use all the instruments and have practice in every kind of electrical work—including measurements, tests of the condition of telegraph lines and cables, tests for locating faults, etc.

As to preparation before entering the University, much the same may be said as in the case of those entering the departments of Civil and Mechanical Engineering.

FARMING AND APPLIED AGRICULTURE.

THE present demand for men educated in the science and practice of agriculture is fair, and likely gradually to grow greater. Many slurs have been cast upon "book farming"; but the experience of all the older countries shows that, as the land is more and more taken up and men are therefore obliged to secure a livelihood from smaller and smaller areas, scientific knowledge must be more and more combined with sound practical sense. Even if there be little call for education applied to agriculture now, this condition of things cannot continue for many years. The young men who are now receiving collegiate education will, before they reach middle life, stand among a hundred million citizens within the boundaries of our Republic. When that day comes—nay, before that—this condition of things in agriculture must change. The present system of routine cultivation—the practice of impoverishing land and then running away to soils more fruitful, with the intention of ruining and running away from them in turn—cannot last. Men must then get a subsistence on less and less land; and they can only get it by bringing to bear upon it better methods. How soon we shall come to the division of property in the Scotch Lothians or the Belgian Waes country, with their simple farms exquisitely tilled and giving a good

support to a thrifty population, cannot now be told; but the steady approximation to it is as inevitable as fate. Already, indeed, the exhaustion of soils in many States demands the aid of science; and there are not wanting examples in American life to show that, on the best of soils, any man with a good basis of practical knowledge can frequently apply scientific principles with excellent effect.

As to the value of education in connection with agriculture, it would be strange if this vast field were the only one to which the application of science is useless,—the only one in which increased powers of observation, and of reasoning from observation, are of no avail. Of all assertions, this would be the most fearful indictment against the most extended field of human thought and work, for it would make agriculture the only pursuit unworthy of a human being. But it is not true. The whole history of agriculture shows exactly the reverse of this. A mere glance at Herbert Spencer's tables in sociology shows that, from its rudest beginnings, observation and reasoning upon observation have been steadily improving agriculture at the same time that they have improved other industries.

As to compensation, few indications can be given. In this profession, more than in any other, the employee easily becomes the employer; it has the advantage of being in many respects the most independent of all, free from the cares and uncertainties accompanying so many others. Already it is becoming less and less easy for the farmer's boy to be sure that the little dark office in the great city block swarming with lawyers is, after all, so much more promising than the farm and orchard and garden and vineyard.

In addition to the sort of work above indicated, there is a steady call for young men practically acquainted with agriculture, to teach the applications of science to it in col-

leges and schools. The supply of thoroughly trained men for this field is as yet below the demand.

As to the advantage of educated men, it is a simple fact that the trained man has, as a rule, more power to concentrate thought, therefore more quickness in discerning between truth and error, than the untrained man. When new facts and circumstances arise, he can more readily grasp the one and adapt himself to the other. There are several fields in which the application of science—that is, of well ordered knowledge based upon observation and thought—is to-day making a decided impression; as, for example, in improving worn-out land, in stock-raising, in dairying of the better sort, in market gardening, in orchard-growing, and in the culture of the vine, for certain special markets and demands.

As to natural aptitudes, we may name a love of outdoor life, of domestic animals and plants, of acquiring information from objects, and a readiness to observe natural processes and to reason upon such observation.

As to facilities offered at Cornell, the student in the agricultural course receives special instruction with reference to his profession, and general instruction with regard to his duties as a citizen and as a man.

As to the former, during an entire year there is instruction in applied agriculture, with field practice two afternoons in each week. A well-conducted farm amply equipped gives the student facilities for observing and taking part in practical work, while, in connection with the experiment station, he has the opportunity of seeing the best experimental work. The agricultural museum serves to illustrate both the earlier and the more recent methods, implements, and products. The botanical department, with its laboratories, collections, and green-houses, where vari-

ous experiments are constantly going on, the laboratories in general and agricultural chemistry, and the department of veterinary science give fundamental principles and practical applications. The student from time to time visits, with the professors, the better farms and herds of the surrounding country, as well as the more important agricultural fairs.

As to *general* discipline and culture, every effort is made to develop his observing and thinking powers, to make him not only practically and scientifically acquainted with his profession, but to give him the ability in thought and expression which will fit him to exercise an influence for good in the community.

As to preparation for entering the Agricultural Department, it should be made as thorough as possible, and especially in mathematics. Every such student should, before entering, be practically familiar with all the usual operations of the farm. It would be bad economy to apply the time of the University course to the A. B. C. of farming; the time for obtaining that is at an earlier period, in the ordinary management of any good farm.

It may be added that, in view of the importance assigned to this department in the charter of the University, all students who enter it are allowed to take the entire course free of all charge for instruction.

GEOLOGY,

GENERAL AND APPLIED.

ANY collection of biographical sketches of Cornell University graduates would show that from the first there has been a steady demand for those who have given their special attention to geology. Some have gone upon the geological surveys of the United States, some upon the State surveys, some upon the surveys of foreign countries, especially those of South America, some into mining companies, some have become instructors and professors in colleges and universities. Such examples indicate a steady demand for young men who unite to good general mental discipline and culture special training in geology. But it is especially in connection with the mining industries that geology comes in as an essential auxiliary. So far as the mining engineer is concerned, it is obvious that the knowledge of structural mineralogy and geology is absolutely necessary to direct technical skill into practical channels. The time is coming, too, when geology will be recognized as the basis of all scientific agriculture.

As to compensation, it varies as in other departments, and any geologist who has, besides his scientific attainments, good business ability, has naturally peculiar facilities for good investment and profitable enterprise.

As to the value of scientific training in this department, it can hardly be over-estimated. It puts a man into conscious possession of his powers, while habituating him to their systematic exercise; saves him from the disastrous fault, which men who "pick up" their knowledge generally fall into, of basing wide generalizations upon a narrow basis of facts; and gives him command of the accumulated observations and reasonings of previous workers. The man practiced in habits of observation and of the proper assimilation of knowledge cannot fail to have a striking advantage over one who "picks up" what he fancies are the principles of geology—especially in view of the fact that, for the solution of many of its problems, there is needed an application of principles derived from other departments of science.

As to present demand, the prejudices that for some time were caused by the ignorance and dishonest representations of men who set themselves up as geologic experts, and the mismanagement and incompetency of others who undertook to superintend great mining enterprises without proper training, have been followed by a reaction which is distinct and strong in the direction of securing men who bring to their calling the best results of scientific and technical education. In the judgment of those most qualified to know, the immediate future opens to properly educated young men a wide field for useful employment, not only in geology but in certain professions to whose successful pursuit this science is an important aid.

A young man who intends to make applied geology his profession, or to make it an important element in his occupation, needs for success patient industry, taste for exhaustive and careful application, the ability to grasp the essential in a great mass of facts, a quick eye to avoid making

too much of mere resemblances. In the school-boy probably only rudiments of these qualities can be ascertained; but the early part of the college course generally furnishes an opportunity to discover whether a student possesses them or the living germs of them.

As to facilities for instruction, this department in Cornell University is now very fully equipped. It has excellent means of illustration for its courses of lectures, convenient and well-lighted lecture-rooms and laboratories for geology, palæontology, and mineralogy, with large and rapidly increasing collections in each of these departments. The new Chemical Laboratory affords excellent additional facilities, and the Library contains not only all the more important standard works, but is constantly adding all really significant new treatises, reports, and periodicals issued in Europe or America.

Very important also for practical work in geology and palæontolo y is the fact that the immediate vicinity of the University, indeed its very domain, presents remarkable facilities for that field-examination of geological structure and phenomena, without which all other means of geological study tend to convey faint and sometimes misleading impressions. There are also within easy reach six of the great palæozoic rock-series, with several of their important subdivisions, replete with their usual fossils and laid open for convenient field-study by numerous natural sections.

As to preparation for entering this course, students are recommended to do as thorough work as possible upon the required studies, as laid down in the Register.

JOURNALISM.

IT is only within the past few years that this country has begun to hear much regarding journalism as a distinct profession. Some of the most successful editors in our country have given their views regarding it; and from the utterances of these, as well as from a survey of the field at large, it is evident that the growth of an immense reading and thinking people is creating a demand more critical in character and greater in extent than any formerly known. The day when mere partisan or personal diatribes formed the stock in trade of the newspaper writer is mainly passed. More and more there is a call for journalists whose knowledge is extended and thorough, whose opinions are based upon well-ascertained principles, whose powers both of thought and statement have been carefully cultivated. It is true that the demand among the large journals of our greater cities for writers in the lowest ranks is apparently exceeded by the supply. There has been, for some years past, a rush of men imperfectly equipped into this lower work, and as a result there seem to be more than enough to fill the ranks of ordinary reporters and subordinates; but the number who are adequately fitted even for these lower positions is evidently not large—those who can give a succinct and satisfactory report of a speech or lecture are still

a small minority. The fact is that even this kind of work demands a breadth of knowledge and a concentration of mind of which the majority of young men, from lack of proper instruction and discipline, are incapable. But even though this supply, such as it is, were to exceed the demand in these lower ranks, the opposite must long be the case in the higher work of the profession. The number of young men who can take up topics of general interest and write upon them briefly and cogently, with that knowledge of general political and constitutional history and of the better solutions of social questions which forms the only proper foundation for the best journalism, is very small indeed. For such men there is a demand, steady and sure to increase.

To re-state it, a young man thoroughly trained to think closely upon political, social, and literary questions, to present his thoughts vigorously and cogently, to use a knowledge based upon good and broad foundations of history and literature, cannot fail to find in journalism a most satisfactory field for all his powers. The attractions offered by the profession to such young men are certainly striking. The compensation in the lower ranks is small, but in the higher it is ample; the successes which bring not only fortune but reputation and great opportunities for useful influence are many. No profession, in the present condition of American society, offers more attractions to the man who desires to exercise a commanding influence for good upon his day and generation.

As to tastes and characteristics which tend to show a natural aptitude for the profession, first may be named an intelligent interest in the leading questions of the day, political, social, religious, a taste for that literature which has to do with such questions, and a fair degree of skill in writing upon topics of interest.

In the journalistic profession, as in so many others, time has brought a change in the requirements for success. Geniuses who are above all rules may even at this day "pick up" the profession; but the great majority of aspirants must more and more give themselves preparatory discipline and culture. The editorial chairs established originally by men of uncultivated genius are now more and more occupied by successors who have been thoroughly educated. This is an additional proof of the fact already stated, that the American people are less and less inclined to be satisfied with the sort of newspapers that pleased their grandfathers; less and less do they care for hap-hazard, partisan declamation, or for long and pedantic leading articles. What they need more and more is just what a young man of good powers and right aptitudes properly trained ought to produce, namely, the discussion of living questions thoroughly, cogently, with broad knowledge of principles and facts, and in small compass.

As to facilities offered at Cornell University, first may be named the general courses of instruction. Either the Classical course, the course in Science and Letters, or the course in Science gives valuable training; but it is believed that the course in History and Political Science affords for the great majority of young men the best preparation for the higher journalistic ranks. In this course there is a basis of the Latin language sufficient to aid in training the judgment and to give that knowledge of language so valuable in any profession which touches literature, and also careful instruction in the two great languages and literatures of continental Europe, with an extended course in English literature, and a good general view of the leading sciences; but the main effort of the student is laid out upon general history, more especially that of the leading modern nations,

and above all that of the United States. As to this latter study, the Professor of American History lectures daily, going over the whole ground exhaustively, and requiring special exercises to test the study and thought of the student.

Secondly, this course embraces lectures in Moral Philosophy and the Philosophy of History, giving principles which form the basis of any proper discussion of so many current questions.

Thirdly, the study of Political Economy. In this three different sets of lectures are given, and the questions on which there is a difference of opinion among thoughtful men, especially the question between those who favor a tariff for revenue and a tariff for protection, are carefully discussed by different professors. It is believed that in this way students are not only made acquainted with the arguments on either side, but that they are mentally quickened and strengthened. To this is added special instruction upon the leading questions of finance, in the light of the best modern experience.

Fourthly, a study of social questions, especially those arising between labor and capital,—those relating to pauperism, insanity, inebriety, crime, and the various modes of dealing with them,—and of the various problems presented by reformers, or pretended reformers, with a consideration of socialistic and other solutions of modern difficulties.

Fifthly, political philosophy, including a careful discussion of the various theories of politics which have been proposed by leaders of political thought in the more important nations, and the practical working out of these theories. Lines of study like these, presented to open and active-minded young men fit them, probably better than could any other courses, to think and to write effectively upon

the leading topics which are more and more to interest the American public.

As to facilities, there are upon the University grounds two libraries very rich in works bearing upon all the questions treated in such a course, namely, the University Library, of about fifty thousand volumes, and the President's Library, of about twenty thousand volumes. Both are rapidly increased by purchase of the most important recent works, especially in the lines above indicated, and both are constantly drawn upon for the illustration of lectures and for the use of students.

Every student in this course is required to take up various leading subjects, and, under the general advice of the professors, to read and think upon them and to discuss them. Discussions, both written and extemporaneous, in the class-rooms and in the debating societies, aid this part of the work. It is hoped that by means of such a course and such an equipment much can be done to send out young men who will eventually take rank in the better political discussion and in the higher ranks of journalism.

LAW.

THE supply of young men for the legal profession seems, at first sight, far beyond the demand. The upper stories of the business blocks in our large towns are apparently filled with them. The question is frequently asked, how so many lawyers can secure a livelihood. Doubtless great numbers of them do not secure a satisfactory support, and some of them simply prey upon the community. But it is none the less certain that American life gives place to a number of lawyers greater relatively than does that of any other country. The rapid extension of business interests, their variety, the hap-hazard way in which they are often conducted, the rushing, pushing character of daily life, the constant ferment of every element in a society always so energetic and often so heedless, give rise to an enormous amount of legal business. The courts of the State of New-York alone, with its five million inhabitants, are thus more heavily burdened than are those of Great Britain, with a population many times as large.

While there is very poor satisfaction for any man in the lowest rank of the profession, there is a steady demand for thoroughly prepared men of ability in its higher ranks. The problems presented to the courts were never so complicated as now ; to grapple with them needs men with minds thoroughly disciplined and matured by thought and study. Hence it

is that the great majority of those who are in these latter days achieving high success at the bar are men trained in our colleges and universities before beginning strictly professional studies. A leading judge in this State recently remarked that the tendency in the legal profession is all in favor of college-bred men. True, there are not infrequently geniuses who achieve high success in the law without a university education; but probably not one of these would not confess his regret that he did not have such preliminary discipline and culture.

The prizes offered to the legal profession were never greater than now; never were its opportunities greater for influencing the country.

That the training of the lawyer fits him especially for taking part in public affairs is proved by the fact that the great majority of those achieving high political position are of the legal profession. It has sometimes been claimed that this great number of lawyers is a misfortune; but the most thoughtful foreigner who ever made a study of American affairs, De Tocqueville, lays especial stress upon the number of men in the legal profession, as a guarantee for the success of constitutional and legal government in the United States.

As to the preparation afforded at Cornell University, there is, first, the time-honored course in Arts, or classical course, by which so many men in all parts of the country have already fitted themselves with distinction for legal study. But the course in History and Political Science presents certain very great advantages. Of the ancient languages it embraces the Latin required in the old classical course, but for Greek substitutes German and French. Time is thus gained for a much larger proportion of studies in history, political economy, and political and social sci-

ence, as well as for literary work. Special opportunities are also afforded for training in writing, public speaking, and extemporaneous debate—the latter not only in debating societies but under the supervision of the Professors in Rhetoric and Literature, with as much preparation as is required for any regular university exercise. The student who is graduated from this course comes to his law-studies with a discipline, maturity, and breadth of mind which soon make themselves felt, and which are sure to make a vast difference in his whole after-career. He is trained to think upon complicated questions and to bring his knowledge to bear upon them; he has a good foundation of that general knowledge, historical, political, and social, which fits him to counsel and direct in any community. With such preparation a man can hardly sink into a pettifogger. If he do any justice to himself, he has every prospect of rising to the rank of lawyers in the best sense, winning success for himself and becoming a useful force in his country.

MECHANICAL ENGINEERING.

THE same causes which have led to a great demand in this country for thoroughly trained civil engineers have produced a demand for mechanical engineers and master mechanics equally well prepared. No matter what financial crises may from time to time arise, there is in all lines of manufacturing a constant creation of machinery. Every manufacturer is striving to produce manufactured goods at less cost by the introduction of improved machines and the employment of educated and thinking labor.

Quite as urgent is the demand made by the great establishments for building and repairing machinery in connection with railway and steamboat communication ; extensive shops are springing up in every part of the country, and these call for an army of men trained in the best methods of construction and supervision. The result is a steady tendency, so far as young men fitted for the higher ranks of the profession are concerned, to better positions and higher salaries.

As to the attractions that the profession offers, the experience of the graduates of the Sibley College of Mechanic Arts in Cornell University gives some interesting points. The great majority of them are filling good positions, many of them high positions, with salaries ranging from twelve

hundred to twelve thousand dollars per year—the latter sum being paid to a graduate of less than ten years standing who is at the head of one of the most important establishments on the Pacific coast. Almost without exception, these graduates are steadily rising toward the most important positions in machine works, foundries, railway shops, and manufactories of various kinds, especially in the Middle and Western States. The first locomotive built in the State of Kansas was recently made entirely from the drawings of one of these recent graduates; and a competent authority declares that "the locomotive is a credit to the draughtsman, to Cornell University, and to all concerned."

To the question, "What tastes and characteristics in a young man would tend to show a natural aptitude for this profession?" the head of the practical side of the department in this University makes answer as follows: "A natural, not forced or prudential, taste for mechanical pursuits, a liking of the work for the good he may do others and not for himself alone, and a determination to succeed, accompanied by industry and perseverance."

The question as to what advantages the man who has received thorough training in a technical college has over the man who "picks up" his profession is answered by the same gentleman, who has had a large experience on both the scientific and practical sides, as follows: "I have had considerable experience in the 'picking up' process, and have found old mechanics very shy in imparting what they know, as they consider it part of their own stock in trade, and I would name, first, advantage in time saved in reaching eminence in the profession; secondly, in the opportunity of obtaining more readily fundamental information; thirdly, in the opportunity of securing by study that which cannot be 'picked up'; fourthly, in the correctness of what a young

man learns by the best practice. Imagine a man trying to master mathematics without a teacher. It can be and has been done—but at a great waste of time and effort."

To the question whether at present there is any difference in favor of the thoroughly educated man which did not formerly exist, the same authority answers: "Most certainly. Look at the advance made within the last fifty years—yes, ten years—in mechanic arts, in modern tools and appliances, methods of shop practice, price system, division or classification of labor, in the uses of electricity, etc. Consider also the failure of our apprentice system. Young men do not learn trades as formerly. If they seek to 'pick up' the trade in any of the shops about the country, they are taught to run some single machine, as a lathe, planer, etc., and confined to that as long as possible, becoming machines themselves. In my opinion, the hope of American mechanics lies in our technical and artisan schools for educating thinking students."

As to facilities offered by the Sibley College of Mechanic Arts in Cornell University, the main equipment arises from the gifts of the Hon. Hiram Sibley, of Rochester, N. Y., amounting to about one hundred thousand dollars. Thus has been provided in part an endowment of the Professorship of Practical Mechanics, a building containing draughting-rooms, lecture-rooms, a foundry and machine shop, with forges, lathes, planers, shaping-machines, milling-machines, drills, etc., moved by water and steam power; also testing and measuring machines, and, for the illustration of machine movements, a series of models more extensive than any other at present existing in the United States. Students, in addition to the mathematics, languages, and sciences connected with the department, are obliged to give a certain number of hours each week to freehand drawing, the draught-

ing of machinery, and to actual work in the shops and foundry under the direction of skilled master mechanics. Under such direction, the students in this department take part in constructing machinery of various sorts, and also tools of precision. Each student is required to begin with the simpler processes and is advanced through the more difficult according to the ability shown in his actual practical performance. Here is seen the great advantage of a practical training of this kind, over that afforded in the ordinary manufacturing establishment: for, in the Sibley College, the student is not kept in a single process any longer than his own interest requires it.

Under the system adopted at this University, the student obtains every practical advantage which can be secured at the manufactory. He is employed largely upon machinery which goes into the market, and thus brought directly into contact with the practical questions of the profession; much more so than if he were entirely employed upon pieces of iron which are afterward cast into the scrap-heap.

As to preparation, the professor above referred to speaks as follows: "By our charter we are liable to receive State students from districts where the only preparation to be obtained is in arithmetic, grammar, geography, and possibly in algebra; but the rule, in this profession as in others, is 'the better the preparation, the better the graduate'; and I would suggest to a young man, were he to ask my advice, as is often done, 'prepare yourself *thoroughly* in the above-named studies; master algebra through radical quantities, the first five books of geometry, study American history and rhetoric, and exercise yourself in writing on subjects about which you know something? Such a preparation, which ought to be obtainable at any thoroughly good school in the country, lays an excellent basis for success in this department."

In conclusion, we may sum up what is of interest regarding this department, by saying that the demand for mechanical engineers and master mechanics is great and rapidly increasing, but that it is a demand less and less for "rule of thumb" men, and more and more for men who combine thorough scientific and practical training; that any young man who has a taste for mechanics and fair abilities can, by aid of the facilities now offered, prepare himself for usefulness in developing the great industries of the country and for high personal success.

MEDICINE.

THERE has been of late years much lamentation over the looseness and inadequacy of medical instruction in the United States, and the immense number of imperfectly equipped men who are swelling the ranks of the medical profession. And there has been much cause for this complaint. The medical profession is very full—indeed, in its lower ranks, overcrowded. Yet never has the demand been greater and more steady for scholarly and thoroughly trained physicians and surgeons. American life, with its ferment, effervescence, complexity, and carelessness, makes heavy demands upon the physician. But the demand is more and more for men thoroughly trained ; for such the prizes are more and greater than ever.

In the facilities which Cornell University offers, not only for general discipline and culture, but especially for laboratory work in general, comparative, and microscopic anatomy, physiology, and zoology, opportunities are offered for young men to lay such general literary and scientific foundations that they can fully profit by a regular course afterward at a medical college, and thus open the door to the higher ranges of the profession.

In order to aid in this work, there has been established here what is known as the "Preparatory Medical Course,"

which, while it gives studies for general culture, lays especial stress upon those branches which should be fundamental to a medical education in the best sense. The aim of this course is to afford young men the discipline in scientific investigation and the general culture in literature requisite to that maturity of mind which enables a student to profit by a regular medical course and secures for him the respect of any community.

The value of this course is shown by the fact that, in the past year, the foremost scholar at each of three leading medical colleges in the State of New York had graduated from it, and that at least one of them has already been advanced far beyond the general rank of his associates in the profession.

Among the advantages offered by the medical profession in its higher ranges, may be mentioned the strong hold which any really esteemed physician or surgeon has upon the community in which he lives. If he be thoroughly well fitted, intellectually and morally, he holds the key to great numbers of human hearts, and his opportunities for exercising a deep influence, especially on social questions, are very great.

In addition to this, may be mentioned the fact that this profession affords the best basis in practical life for young men who wish to indulge a taste for natural history. It is a well-known fact that a large number of the most successful men in various departments of natural science have found time to achieve this eminence while practicing the medical profession.

As to aptitudes, a love of natural science, and especially of physiological investigation, is perhaps as important as any.

As to preparation, it is recommended that the student,

while making himself thorough in the branches laid down in the Register as required, give such time as he can to observation, simple investigation, and reading in the line of his main object.

MINING ENGINEERING.

THOUGH Cornell University has not yet established a complete course in mining engineering, the main studies required for it are pursued in the departments of Civil Engineering, Chemistry, and applied Geology, to which heads in this pamphlet and in the University Register the reader is referred. A student having pursued those studies which Cornell University offers, can in a short time, in any of the leading mining establishments of the country, secure all necessary supplementary practice and information.

TEACHING.

THERE is probably no subject on which there is so great unanimity among Americans as the importance of education. The demand for teachers, male and female, in all grades, from the instructorships in common schools to the professorships and presidencies of our universities, is constant and increasing. Hardly any college officer fails to receive many letters during the year asking for teachers in the lower and intermediate grades; and not a year goes by in which Boards of Trustees of some of our colleges and universities are not diligently seeking the right men for the highest places in their gift. The change in this respect during the last thirty years has been very great. Formerly the range for instructors was small; but now the multiplication of professorships, and especially the development of the modern sciences, has led to a vast extension of the field and to a great increase in the demand. The munificence of individuals and of States is rapidly creating, at various points in the country, large universities, which are demanding more and more thoroughly trained men for their professors' chairs; and the great commonwealths which are growing in the South and West are laying the foundations for extensive school systems, which are steadily increasing the demand for instructors.

The Cornell University has by its various courses—classical, scientific, literary, and philosophical—aimed to do its part toward meeting this demand; and in nothing do its Faculty take more pride than in the number of its graduates now holding professors' chairs in high-schools, normal schools, colleges, and universities.

It is believed that the method pursued here insures rapid and successful training for any part of the field. The student wishing to fit himself as an instructor in the classics finds professors familiar with the best methods at home and abroad, with ample illustrative material, and with one of the largest classical libraries in the country; and, what is of even more importance, he is not held back by a large number of young men who are taking classical studies perfunctorily and simply because they cannot graduate without taking them. He fits himself in the midst of a body of students who are taking classical instruction because they prefer it, and who wish to advance rapidly in it. And the same may be said regarding the higher mathematics and the various fields of scientific instruction.

As to required preparation, the student is referred to the Register.

THEOLOGY.

IT is sometimes said that, as men are less credulous in these days than formerly and as books on every subject are becoming so numerous, the mission of the clergyman is nearing its end. That this view is very shallow is proved by the fact that never was there a greater call in all parts of this country for thoroughly equipped clergymen than now, and never was the position given to such clergymen more honorable and influential.

In this department there is a demand for which the supply is utterly insufficient. Hence it is that many of the leading pulpits in our great cities are more and more supplied from England, Scotland, and Canada. But this demand is not exactly of the same sort as that of fifty years ago. The demand is not now for *a* clergyman, but for *the* clergyman —for the man of good powers well disciplined and cultured—fit to grapple with the problems now presenting themselves to thinking men. For men thus fitted no field could be more attractive. No person is more respected and beloved than the clergyman fit for his station; none, certainly, has a nobler mission; none has greater opportunities to make a lasting impression for good upon the community in which he lives. The wealth of great city congregations, the earnest exertions of large bodies of the most active cit-

izens, are constantly put under his direction. It is a high and noble calling, but success in it demands more than ever before. A mere slipshod college preparation of the old sort, with a short stay in the theological seminary at its close, and with the merest smattering of Greek, Hebrew, and metaphysics, cannot give the equipment needed. A young man about to embark in this field should not only be trained in some course embracing the studies which have been considered essentials in the older college courses, but he should have a clear knowledge of the elements, at least, in the development of modern science. He should know something, too, of the most approved means of dealing with complicated modern social problems; and no preacher should go forth without a good knowledge of the history of previous generations and its bearing upon his own.

An earnest effort has been made in this direction by the Cornell University. Its authorities are especially proud of those who have already gone from it into the pulpits of the various religious bodies. Some of these are achieving high distinction. In a recent address, one whose success has been very rapid and remarkable, the Rector of one of the largest churches in our metropolis, said in substance: "I was brought up in a family deeply devoted to the church to which I belong,—I was sent to a school in which all the teachers and nearly all the trustees were of that church,—I was sent to a college carried on in the interest of the same religious faith. But I left that college and went to Cornell —and I wish now publicly and distinctly to declare that I cannot but regard my decision in this matter as providential. It is true that I found at Cornell men of all sorts of religious views, and of no religious views, but I found what I would have to meet as a clergyman in the world at large. I found what honest-minded men were thinking of, the prob-

lems they were trying to solve, and the helps to their solution. I found also professors who gave me efficient aid in my efforts to study these problems. It was in this atmosphere, as I firmly believe, that I gained the power which has led to any success which has since been granted me. Had I remained at the college of my own church, gone as I afterward did to a theological school in which the same ideas and and no others were inculcated, and then finally settled as clergyman over a church where I must be entirely surrounded by men and women of my own religious faith, I should have known as little of the world outside, of the real work to be done, of the real difficulties to be grappled with, of the real problems presented by modern life and of the best ways of meeting them, as very many excellent men in the ministry now seem to do. I count it one of the greatest of my blessings that I was taken during my college course out of this purely denominational atmosphere and brought into the midst of the currents of actual modern thought—among many men of many minds, giving a picture of the real world at large and not of a mere fragment of it."

In addition to various means of instruction at Cornell University fitting men for usefulness in this field, there is one opportunity such as is afforded, so far as is known, nowhere else. Some years since, a benefactor of the University founded a beautiful chapel, and his son gave an endowment for a University preachership. This enables the University to secure over forty sermons each year from the most distinguished men in the American pulpit, without regard to denominational connection. The list of these University preachers upon the Dean-Sage Foundation is very remarkable. Hardly a name of distinction in any denomination is absent from it, and there are constantly added to it young preachers of great promise from all parts of the country.

It is certain that this course of sermons has been a powerful means of good among the students; to those intending to enter the ministry it has been of the greatest value, not only inspiring them and strengthening their best purposes, but enabling them to see great religious questions presented by the foremost religious thinkers of the country, and with all those powers which have secured those preachers success. In the whole series of these sermons, which have now continued through several years, there has never been any merely sectarian preaching. The great fundamental ideas of Christianity have been presented from different points of view and by different methods, but in such a manner as not to confuse but to elevate and strengthen the hearer's views, and in the highest sense to give them unity.

If the student is devoted to his own church, there is nothing in this system which need draw him from it. Very many students attend the church of their own denomination in town at the morning and evening services, but attend the University chapel in the afternoon, when there is no service at their own churches. It is believed that this system, in conjunction with the great range of studies offered at the University, gives, to say the least, as good a preliminary training to one intending to study specially for the ministry as can be afforded in this country.

PHYSICAL CULTURE.

THE importance of a sound body to a young man entering any profession has led the University authorities, during the past year, to erect one of the largest gymnasiums in the country, and to equip it thoroughly with the best apparatus of all sorts. In addition to this, they have provided a smaller but well-equipped gymnasium for lady students at Sage College. They have also laid out and graded a field for athletic exercises in the open air, and within proper limits have favored boating, for which Cayuga Lake affords excellent opportunities.

But what is of still more importance, they have now established a full department of Hygiene and Physical Culture, in which every student in every course of study will be required to take exercise, and thus insure the union of good physical and intellectual health. To the headship of this department they have called a professor who is both an experienced gymnast and a Doctor of Medicine. He will conduct careful preliminary examinations of all students entering the University, prescribing such course of physical exercise as each, in view of his physical constitution, shall be found to need; will see that any young man who has any tendency toward chronic disease which over-exertion might develop shall be restrained from the more severe forms of exercise; and will maintain a general control over athletic sports, to see that they shall not usurp time required for study.

GENERAL PREPARATION

OF THOSE WHOSE PLANS REGARDING A PROFESSION REMAIN UNDECIDED.

A VERY large proportion of young men entering college do not arrive at a decision regarding a profession until some time after beginning their college course. In very many cases this is just as well; in some, better. The student, after he has entered the University, has the opportunity to consult professors interested in his success, to discuss the subject with his thoughtful classmates, and to study the problem with his powers matured, his knowledge increased, and his field of observation widened. It is therefore fortunate that the first two years of all the University courses are mainly occupied with studies for general discipline and culture—studies calculated to give the student moral and intellectual breadth and strength. If, then, he decides on a profession before the close of the second year of his college course, he can easily shape his studies so that the last two years shall be thrown in the direction of the pursuit he has chosen. But, even if he defer his decision until the close of his university career, the several general courses, such as the Arts or classical course, the course in History and Political Science, the course in Science and Letters, and others, enable him to acquire general disci-

pline and culture which will be found of very great value, whatever his decision may be and whenever made. A student who has done justice to such opportunities will find the University authorities ready to aid him with letters of introduction and recommendation to persons influential in his chosen profession.

GENERAL STATEMENT.

WITH regard to the general character of the University it seems necessary to remove certain misapprehensions.

1. The fact that there are many different courses of instruction offered has led some to suppose that the student is tempted to waste his powers among a great multitude of subjects. This is not at all the case. The whole theory of presenting these various courses is simply one that is constantly acted upon in practical life, namely, that men differ in aims and tastes and bias of talent, and that account should be taken of this difference. A student does not simply wander about among studies, taking here a little and there a little; but, when the most suitable course is determined upon, he is expected to throw his strength into that, and to allow no other work to distract him from it.

2. The fact that in some of the courses there is an omission of Greek, and in some of both the ancient classical languages, with a substitution of modern literature, science, and languages, does not indicate that less real work is required of the student. On the contrary, it is found that more work and better can be obtained in this way. The instructors for the classical work have been chosen with great care. The portion of the library given up to the an-

cient classics amounts to nearly ten thousand volumes, and a very full equipment has been secured of photographs, models, maps, charts, and the like, to illustrate classical studies; but it has not been thought best to drive into classical studies those who do not really wish to take them, and it is found that in this way those who do care for the classics are enabled to do far more and better work than when obliged to drag along in their classes a large number who do not care for them. And on the other hand, it is found that many a young man who would merely drone through Greek or Latin, because they seem remote to him and because he cannot appreciate their bearings upon his future profession, will enter heartily into the great modern languages and literatures, into science, and into the application of science to various industries.

3. It seems proper here to refer to a certain prejudice that has arisen against the University because, on account of its State endowment and the terms of its charter, it is not and cannot be connected with any one religious denomination. On this has been based the charge that the institution is irreligious. Nothing can be farther from the truth. While the institution is non-sectarian, its foremost aim is to promote and aid in the development of an American civilization moral and religious in the highest sense. Hence it was that one trustee of the University built a commodious and beautiful university chapel, that another fitted up a room for the Young Men's Christian Association, and that another friend endowed a preachership which enables the University to give its students sermons by the most distinguished preachers of all the great denominations. These preachers, as has already been stated, do not present sectarian tenets. On the contrary, their aim has always been to present the great fundamental principles and facts in mor-

ality and religion. While the University authorities do not drive students to the University chapel, they have attracted them by thus presenting a series of sermons which form an epoch in the educational history of this country. This plan has been successful. Instead of listless audiences of unwilling students, the Cornell University chapel has, as a rule, contained large audiences of students attentive and thoughtful.

It may also be mentioned here that ever since the foundation of the University there has been a flourishing Young Men's Christian Association, which has a tasteful room in one of the college buildings, and which has wrought on steadily and earnestly for the good of the whole student body; and that students have from the first taken effective part in Sunday-school and Bible-class instruction, as well as in the mission work of various churches in Ithaca.

4. In simple justice a statement should be made regarding the number of students. A few years since, the standard of admission having been raised, and the financial stringency in the country coming at the same time, there was a temporary decline in numbers; but it may now (1884) be stated that for the last two years there has been a steady increase, so that in the present year there are over seventy more undergraduates than in the year 1883, with indications of a still larger addition in the coming year.

NOTICE

REGARDING THE UNIVERSITY REGISTER.

THE University Register, containing a catalogue of the Trustees, Faculty, University Preachers for the year, and students, as well as full details regarding equipments, courses of study, entrance examinations, and State scholarships, with samples of examination papers, lists of works of reference, etc., may be obtained by addressing the Treasurer of Cornell University, Ithaca, N. Y.